89325

S/033/61/038/001/008/019
E032/E314

(p, n) and (p, 2n) Reactions and the Origin of Bypassed Nuclei

La^{138} and Ce^{138} are bypassed. The scheme involves La^{138} which is unique in the sense that it can be formed in a number of ways. For the remaining bypassed nuclei the number of possible ways of formation is much more limited. Table 1 which refers to nuclei with $Z > 30$ gives the ratio of the abundance of the nuclei to the abundance of the parent nuclei for different formation mechanisms.

The $(p, \gamma)^2$, $(p, n)^2$ and $(p, 2n)^2$ columns refer to two successive nuclear reactions of the given type. "Parent nuclei" are understood to lie along the path of neutron capture. As a rule they are stable and their abundances are known. The only exception is Ru^{98} whose parent in the (p, 2n) reaction is a technetium isotope with a lifetime of 200 000 years. Since the abundance of the parent nucleus is unknown the sign "+" is included in the table, indicating the possibility of the given process. The sign "-" indicates

S/033/61/038/001/008/019
E032/E314

4

(p, n) and (p, 2n) Reactions and the Origin of Bypassed Nuclei

that the particular bypassed nucleus cannot be formed by the given reaction directly from nuclei lying in the path of neutron capture. As can be seen from Table 1, the majority of bypassed nuclei can be obtained from parent nuclei which lie along the path of neutron capture through two (p, n) reactions or one (p, 2n) reaction. A single (p, n) reaction is sufficient only in the case of lanthanum which, however, cannot be obtained through a (p, 2n) reaction and in the case of cerium for which the "yield" in this reaction is found to be greater than unity and must therefore be excluded. The only bypassed isotope which cannot be obtained either from a single reaction or from two successive (p, n) or (p, 2n) reactions is La^{138}. However, as was pointed out above, this isotope has certain unique properties. Table 1 does not include photonuclear reactions and the equivalent (n, 2n) reactions. Of all the bypassed nuclei only La^{138} can be obtained through a

Card 4/9 7

89325

S/033/61/038/001/008/019
E032/E314

(p_γ n) and (p, 2n) Reactions and the Origin of Bypassed Nuclei

(γ_γ n) or (n, 2n) reaction. Any of the bypassed nuclei can be obtained through (γ_γ 2n) reaction but this reaction is excluded on the basis of energy considerations. It is argued that there is no basis for ascribing the formation of bypassed nuclei to photonuclear processes since the necessary hard γ rays are not expected to be present. Another strong argument against the formation of bypassed nuclei by the (p_γ γ) reaction is derived on thermodynamic grounds. Detailed thermodynamic argument shows that the abundance of bypassed nuclei does not satisfy the conditions of thermodynamic equilibrium.. The paper is continued with a discussion of the iron maximum. It is pointed out that further calculations are necessary before this can be definitely settled. The general conclusion is that the observed abundances can be used in arguing in favour of the formation of the bypassed nuclei by two successive (p_γ n) reactions or one (p, 2n) reaction. The same reactions can

Card 5/7

89325

S/033/61/038/001/008/019
E032/E314

(p, n) and (p, 2n) Reactions and the Origin of Bypassed Nuclei

be regarded as a source of neutrons for the synthesis of heavy nuclei. The necessary protons with energies of several MeV should be formed in the process of "cold acceleration". The cold acceleration mechanism should consist of two stages, namely, primary gas-dynamic injection and a subsequent electromagnetic acceleration. The gas-dynamic injection should communicate to the ions a velocity not smaller than the thermal velocities of electrons. This injection may be associated with shock waves (Gandel'man et al - Ref. 7). The final section is concerned with the problem of deuterium and it is argued that the (p, n) reactions are the only possible source of deuterium in a hydrogen-containing medium. Acknowledgments are expressed to E.M. Burbridge, G.R. Burbridge, A.G.W. Cameron, W.A. Fowler, F. Hoyle, A.K. Lavrukhina and G.N. Flerov for valuable discussions. There are 4 figures, 2 tables and 9 references: 5 Soviet and 4 non-Soviet.

SUBMITTED: May 25, 1960
Card 6/9 7

89325
S/033/61/038/001/006/019
E032/E314

(p, n) and (p, 2n) Reactions and the Origin of Bypassed Nuclei

Table 1:

Таблица 1

Выходы для разных путей образования обойденных ядер

	(p, γ)	(p, γ)*	(p, n)	(p, n)*	(p, 2n)	(p, 2n)*
Se^{74}	—	0.05	—	0.04	0.16	
Kr^{78}	—	0.03	—	0.01	0.03	
Sr^{84}	—	0.02	—	0.003	0.02	
Mo^{92}	—	0.013	—	0.04	0.36	
Ru^{96}	—	0.38	—	0.21	—	0.15
Ru^{98}	—	0.08	—	0.05	+	
Pd^{102}	—	0.03	—	0.01	0.02	
Cd^{106}	—	0.18	—	0.06	0.01	
Sn^{112}	—	0.12	—	0.06	—	0.05
Te^{102}	—	0.01	—	0.01	0.03	
Xe^{124}	—	0.04	—	0.02	—	0.005
Xe^{126}	—	0.02	—	0.004	0.005	
Ba^{130}	—	0.49	—	0.24	—	0.04
Ba^{132}	—	0.02	—	0.003	0.01	

Card 7/9

S/056/61/041/002/024/028
B125/B138

26.2311

AUTHORS: Bartov, A. V., Zavoyskiy, Ye. K., Frank-Kamenetskiy, D. A.

TITLE: Magnetoacoustic resonance in strong magnetic fields

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 2(8), 1961, 588-591

TEXT: The authors put aside the previous limiting condition $\omega_0^2 \gg \omega_e^2$ in order to study the possibility of the occurrence of resonance phenomena of the magnetoacoustic type in a plasma with a concentration variable in time. They study the case where the plasma frequency is of the same order as, or less than, the electron cyclotron frequency. Here, ω_e denotes the electron cyclotron frequency. This case occurs either in a rarefied plasma (low plasma frequency) or in very strong magnetic fields (high cyclotron frequency). A plasma with a cyclotron frequency higher than collision frequency is said to be magnetized (with regard to collisions). If the cyclotron frequency is higher than the plasma frequency, the electrostatic oscillations will be magnetized. Such a

Card 1/5

plasma shows oscillatory magnetization. Then, the ratio $\omega_0^2/\omega_e^2 = 4\pi nmc^2/H^2$ is about the same as the ratio of electron rest energy to magnetic energy. Thus, a plasma with magnetic energy higher than the electron rest energy will undergo oscillatory magnetization. In a rarefied plasma, the resonance frequency of magnetic sound will, with a purely radial propagation, approach the lower hybrid frequency. The following general expression for the lower hybrid frequency is derived:

$$\omega_h^2 = \omega_i \omega_e \frac{\omega_0^2 + \omega_i \omega_e}{\omega_0^2 + \omega_e^2} \qquad (1).$$

The approximate formula derived by D. A. Frank-Kamenetskiy (ZhETF, 39, 669, 1960) holds for $\omega_0^2 \gg \omega_i \omega_e$. When $\omega_0^2 \ll \omega_i \omega_e$, the lower hybrid frequency tends towards the ion cyclotron frequency, and when $\omega_0^2 \gg \omega_e^2$, towards the geometric mean of ion-electron the cyclotron. There is a wide interval $\omega_e^2 \gg \omega_0^2 \gg \omega_i \omega_e$, in which the approximate formula for the lower hybrid

frequency reads $\omega_h^2 \sim \omega_0^2\ \omega_i/\omega_e$ (2). Here, the lower hybrid frequency is proportional to the plasma frequency. At a given magnetic field strength (ω_e = const) the resonance frequency of magnetic sound decreases with increasing concentration in a dense plasma and increases in a rarefied one. In between, it should pass through a maximum. If the maximum is flat enough, resonance may occur over a wide range of concentrations. The dispersion relation

$$\Omega^5 - b_4\Omega^4 + b_3\Omega^3 - b_2\Omega^2 + b_1\Omega - b_0 = 0; \quad (7)$$

$$b_4 = 3A + B + 2R\,(1 + \mathrm{ctg}^2\,\theta),$$
$$b_3 = A^2 + 3AB + B^2 - [2A + B + R\,(1 + \mathrm{ctg}^2\,\theta)]^2,$$
$$b_2 = (A + B)\,[A + R\,(1 + \mathrm{ctg}^2\,\theta)]^2 - AB\,(A + R),$$
$$b_1 = AR\,[A + R + BR\,\mathrm{ctg}^2\,\theta\,(1 + \mathrm{ctg}\,\theta)],$$
$$b_0 = AR^2\,\mathrm{ctg}^2\,\theta\,(1 + \mathrm{ctg}^2\,\theta).$$

defines the dimensionless frequency $\Omega = \omega^2/\omega_i\omega_e$. Neglecting all coefficients except b_2 and b_1, the following approximate formula is

Card 3/5

obtained where $\cot^2\theta \ll 1$: $\Omega = \left(1 + \frac{BR}{A+R}\cot^2\theta\right)\Big/\left(\frac{A}{R} + 1 + \frac{B}{A}\right)$ (8). The formula corresponds to the "long cylinder approximation". In these formulas, $A = \omega_0^2/\omega_i\omega_e$ (4) indicates the square of the Alfvèn index of refraction; $B = \omega_e/\omega_i$ is the ratio of the cyclotron frequencies; $R = k_1^2c^2/\omega_i\omega_e = k_1^2\tilde{r}_i\tilde{r}_e$; $\tan\theta = k_1/k_3$. Here, ω is resonance frequency; ω_0 is plasma frequency; ω_e and ω_i are the electron and ion cyclotron cyclic frequencies; k_1 and k_3 are the radial and the longitudinal wave numbers; $\tilde{r}_e$ and $\tilde{r}_i$ are the cyclotron radii at the velocity of light; and $0 \leqslant \theta \leqslant \pi/2$. Under the usual experimental conditions, the "long cylinder approximation" is satisfied with sufficient accuracy. When $\theta = \pi/2$, the maximum in this approximation lies at $A = \sqrt{BR}$, and the maximum value of the dimensionless frequency is $\Omega_m = \sqrt{BR}/(2B + \sqrt{BR})$ (9). The position of the maximum is only slightly shifted, whereas its height increases considerably. The authors' investigations are of great importance in the interpretation of

S/056/61/041/002/024/028
B125/B138

Magnetoacoustic resonance in strong...

experiments on magnetoacoustic resonance under non-linear conditions. There are 1 figure and 7 references: 4 Soviet and 3 non-Soviet. The reference to the English-language publication reads as follows: P. Auer, H. Hurwitz, R. Miller. Phys. Fluids, 1, 501, 1958.

SUBMITTED: March 16, 1961

Card 5/5

FRANK-KAMENETSKIY, D.A., prof. (Moskva)

Superstition or premeditated deception (Flying saucers by D.Menzel. Reviewed by D.A. Frank-Kamenetskii). Priroda 50 no. 3:118-119 Mr '61. (MIRA 14:2)

(Flying saucers) (Menzel, D.)

89620

S/020/61/136/002/034/034
B016/B060

9,4300 (1138, 1164, 1331)

AUTHOR: Frank-Kamenetskiy, D. A.

TITLE: Plasmatic Phenomena in Semiconductors and the Biological Action of Radio Waves

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 2, pp. 476-478

TEXT: The author raises the question as to whether some specific orderliness may be expected in live matter. If so, it is bound to express itself in a quasi-periodicity of the inner field, which allows collective levels of electron excitation and conductivity zones to arise. Being a specific feature of live matter, the orderliness postulated by the author is bound to disappear after death. Great importance is attached to the proof of this type of orderliness. As is well known (Ref. 9), the diamagnetic susceptibility increases after the death of a live cell. A much more general expression of this orderliness is provided, however, by collective excitation levels and energy zones of the semiconductor type. Among other things, biological objects offer great possibilities of studying the

Card 1/3

89620

Plasmatic Phenomena in Semiconductors and the Biological Action of Radio Waves

S/020/61/136/002/034/034
B016/B060

cyclotron resonance. This process resembles the internal photoeffect and is bound to entail consequences reminding one of the action of ionizing radiations: the lethal and the mutagenic actions. Since the quasi-periodic structure under consideration can be destroyed with the death of the organism, experiments with live organisms, and not with isolated biopolymers, is desired. The following suggestion is made here: a bacteriologic culture is frozen and low-cooled, and is then exposed to high-frequency electromagnetic fluctuations. A sufficiently high percentage of surviving bacteria must be secured by an adequate thawing velocity and by the choice of a suitable kind of bacteria. It is then possible to establish the lethal or mutagenic action of the vibrations depending on their frequency and the temperature of the substrate. Also suggested is the observation of plasmatic resonances in the static magnetic field or the non-resonance absorption. The test with frozen cultures eliminates the thermal action from the outset, since the initial temperature lies much deeper here than that of the protein coagulation. In the author's opinion, the radio waves ought to exert, biologically, the strongest action in two extreme temperature ranges: a) near the coagulation temperature of the protein, and b) at lowest temperatures. In the a) range this action has a

Card 2/3

89620

Plasmatic Phenomena in Semiconductors and the Biological Action of Radio Waves

S/020/61/136/002/034/034
B016/B060

trivial chemical character. In the b) range the appearance of non-thermal plasmatic phenomena is noted. In the range between a) and b) the action must be a minimum. The author does not mention any studies of his own, but refers to V. L. Troitskiy's paper (Ref. 15), and thanks E. M. Trukhan for valuable remarks. There are 15 references: 11 Soviet, 3 British, and 1 US.

PRESENTED: July 21, 1960, by A. P. Aleksandrov, Academician

SUBMITTED: June 24, 1960

Card 3/3

FRANK-KAMENETSKIY, D. A.[Frank-Kamenets'kyi, D. A.]

Below absolute zero. Des. such. fiz. no.6:56-64 '62.
(MIRA 15:1)

(Temperature)

FRANK-KAMENETSKIY, D. A.[Frank-Kamenets'kyi, D. A.]

Origin of chemical elements. Dos. such. fiz. no.6:94-126 '62. (MIRA 16:1)

(Chemical elements)

S/033/62/039/002/003/014
E032/E514

3,1560

AUTHORS: Kuznetsova, T.D. and Frank-Kamenetskiy, D.A.

TITLE: Radiative thermal conductivity of completely ionised hydrogen plasma

PERIODICAL: Astronomicheskiy zhurnal, v.39, no.2, 1962, 247-255

TEXT: The authors report the results of calculations of the Rosseland mean opacity and the radiative thermal conductivity of ionised hydrogen. The calculations take into account electron scattering and bremsstrahlung processes. The theoretical treatment is a continuation of the work reported by the second of the present authors in Ref.1 ("Physical processes in stars", Fizmatgiz, 1959). The results are compared with the Sommerfeld (Ref.4: "Atomic structure and spectral lines", Gostekhizdat, Moscow, 1956) and Elwert (Ref.6: Ann.Physik, 34, 178, 1939) approximations. The calculations were carried out for temperatures T = 0.1, 0.5, 1, 2.5, 5, 10, 20 and 40 million degrees. The computation involved a numerical integration of the hypergeometric differential equation by the Runge-Kutta method. The conclusion is that the Sommerfeld approximation can be employed at temperatures in

Card 1/2

excess of 10^6 degrees, while the Elwert approximation gives excellent agreement with the exact formula given in Ref.1 in the above temperature range. Moreover, the approximate calculations reported by the second of the present authors in Ref.3 (Astron. zh., 31, 327, 1954) are adequate for practical calculations. The asymptotic formulae for large α given in Ref.3 are in disagreement with the present computer calculations. This is due to the fact that the asymptotic formulae strictly hold only for $\alpha \sim 100$ (α is a parameter describing the ratio of absorption to scattering). There are 2 figures and 2 tables.

SUBMITTED: April 26, 1961

NADEZHIN, D.K.; FRANK-KAMENETSKIY, D.A.

Spherically symmetric models of explosions of novae.
Astron.zhur. 39 no.6:1003-1005 N-D '62. (MIRA 15:11)

1. Moskovskiy fiziko-tekhnicheskiy institut.
(Stars, New)
(Astronomical models)

24 6600

35576

S/056/62/042/003/037/049
B108/B102

AUTHOR: Frank-Kamenetskiy, D. A.

TITLE: Kinetics of neutronization at superhigh densities

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 3, 1962, 875-879

TEXT: The process and conditions of neutronization as they occur, e.g. in the gravitational collapse of a star are studied. Powerful compression of a substance may cause its electrons to unite with the protons and form neutrons. This process is considered for a completely degenerate electron gas in which the chemical potential of the electron is equal to its Fermi energy. The probability of neutronization can be expressed just like a recombination probability and the matrix elements derived from the inverse process, i.e. from beta decay. Neutronization commences as soon as the Fermi energy ε_m has reached the energy difference Δ of the process $A + e^- \longrightarrow B + \nu - \Delta$. The course of neutronization with time can be described as $dN/dt = (1/Z)dn/dt = -WN = -\bar{W}N/ft_\beta$. n - electron concentra-

Card 1/2

Kinetics of neutronization ...

tion, N - concentration of nuclei, f and t_β - statistical Fermi function and exponential time for inverse β-decay. The neutronization probability W is equal to $\bar{W}/ft_\beta$, where the dimensionless function $\bar{W} = w(\varepsilon_m) - w(\Delta)$ and $w(\varepsilon) = \int_1^\varepsilon \varepsilon\sqrt{\varepsilon^2 - 1}\,(\varepsilon^2 - \Delta)^2 d\varepsilon$. ε is the electron energy. For high densities, $\bar{W}$ tends to $(1/5)(\varepsilon_m^5 - \Delta^5)$, which expression can be used when $\Delta \gg 1$. Quite generally, it is sufficiently accurate for all nuclei except hydrogen. By order of magnitude, the time of neutronization is $t_n \sim 3ft_\beta\Delta^{-5}$. Neutronization in He and C proceeds within about 10^5-10^4 sec, whereas H and Fe have values of t_n of respectively 17 and 4 sec. There are 1 figure, 1 table, and 5 references: 3 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: A. Feingold, Rev. Mod. Phys., 23, 10, 1951; A. G. W. Cameron. Astrophys. J., 130, 916, 1959.

SUBMITTED: October 13, 1961

Card 2/2

KOVAN, I.A.; PATRUSHEV, B.I.; RUBANOV, V.D.; TILININ, G.N.; FRANK-KAMENETSKIY, D.A.

Effect of spatial amplification of variable magnetic fields in the case of magnetoacoustic resonance in a plasma. Zhur. eksp. i teor. fiz. 43 no.1:16-20 Jl '62. (MIRA 15:9)
(Magnetic fields) (Plasma (Ionized gases))

FRANK-KAMENETSKIY, D.A., prof. (Moskva)

New data on "new" stars. Priroda 51 no.7:119-120 Jl '62.
(MIRA 15:9)

(Stars, New)

FRANK-KAMENETSKIY, D.A., prof.

Two types of neutrino. Priroda 51 no.11:111-112 N '62.
(MIRA 15:11)
(Neutrinos)

FRANK-KAMENETSKIY, D.A., prof.

Decrease of light frequency in the field of gravity.
Priroda 51 no.11:117-118 N '62. (MIRA 15:11)
(Quantum theory)

S/020/62/143/001/013/030
B104/B108

AUTHOR: Frank-Kamenetskiy, D. A.

TITLE: Multiple nucleon pair production and the supernovae

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 1, 1962, 78-80

TEXT: The condition of equilibrium of the reaction $m\pi^0 \rightleftarrows N + \tilde{N}$ is investigated. For the relative nucleon concentration in a sphere of mass $\mathcal{M}$ and uniform density,

$$\frac{\tilde{n}}{n} = 0{,}22\,\beta^3 \mathcal{M}^4 \xi^3 \exp\left(\frac{A - 4\xi}{\beta}\right) \qquad (14)$$

is obtained, where β is the thermalization coefficient, ξ the compression parameter of the sphere matter and $\mathcal{M}$ the solar mass. The following conclusions are drawn: If the mass of the considered sphere, e.g., the burnt out core of a heterogeneous star, is of the order of the solar mass, the relative concentration of the nucleon pairs is small. However, if the mass of such a core is of the order of 10 solar masses, practically all of the substance has passed into the state of nucleon pairs. Nucleon pair production phenomena in the case of gravitational compression and all

Card 1/2

Multiple nucleon pair production ...

other effects, where gravitation and nuclear forces occur simultaneously, are called epigravitational phenomena. A substance consisting of nucleon pairs stabilized by a gravitational field and high temperature, is termed an epigravitational plasma (epiplasma). The development of such an epiplasma in the final stages of gravitational compression of a star during the supernova-state is discussed. L. E. Gurevich and I. S. Shklovskiy are thanked for discussions. V. A. Ambartsumyan (Soobshch. Byurakansk. obs., no. 13 (1954)) is mentioned. There are 11 references: 6 Soviet and 5 non-Soviet. The four most recent references to English-language publications read as follows: E. M. Burbidge, G. R. Burbidge et al., Rev. Mod. Phys., 29, no. 4, 547 (1957); F. Hoyle, W. A. Fowler, Astrophys. J., 132, no. 3, 565 (1960); A. G. W. Cameron, Astrophys. J., 130, no. 3, 884 (1959); E. E. Salpeter, Ann. Phys., USA, 11, no. 4, 393 (1960).

PRESENTED: October 16, 1961, by A. P. Aleksandrov, Academician

SUBMITTED: May 24, 1961

Card 2/2

S/020/62/144/002/008/028
B104/B102

AUTHOR: Frank-Kamenetskiy, D. A.

TITLE: Multiple nucleon pair generation by thermal photons in an open cosmological model

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 2, 1962, 307-309

TEXT: The presence of a small number of trans-threshold photons at the "tail" of Planck's distribution in an unbounded space filled with thermal radiation may lead to multiple generation of nucleon pairs appearing as large-scale fluctuations. The probability density of the multiple generation of N pairs in the volume V per unit time reads as

$$W_N = W_1\Omega_N = \frac{\bar{\sigma}\bar{v}N^2}{V}\left(\frac{V}{N\lambda_T^3}\right)^{2N} e^{-2\eta Nmc^2/kT},$$

If the gravitational energy is low compared with the natural energy of a fluctuation, the rest energy is given by $\varepsilon_0 = m(c^2+\varphi)$. Here W_1 is the probability of nucleon pair production, Ω_N is the probability that N

Card 1/3

successive pairs form after the first, and $\varphi < 0$ is the gravitational potential. Immediately after being generated, these "classical" fluctuations undergo gravitational contraction on the time scale $t_g \approx (G\varrho)^{-1/2}$, G being the gravitational constant. Assuming a given number of particles, the probability of a classical fluctuation increases with the volume. The largest scale of nonequilibrium fluctuations, found from $W_{max} t_g \approx 1$, reads

$$W_{max} = N\lambda_T^3 \chi e^{\eta mc^2/kT},$$

$$\rho_{min} = \frac{m}{\lambda_T^3 \chi} e^{-\eta mc^2/kT},$$

η is a dimensionless number approximately equal to unity. The characteristic time $t \sim (\lambda_T^3 \chi/Gm)^{1/2} \exp(\eta mc^2/2kT)$ is both the time for contraction and for the formation of fluctuations. Fluctuations with a large number of particles are the most probable. Relativistic fluctuations are much more probable than "classical", but gravitation and strong

Card 2/3

interactions must be taken into account. These give rise to "epigravitational" phenomena, such as the formation of "epiplasma" (consisting of nucleons plus antinucleons) and concomitant "epifluctuations".

PRESENTED: December 13, 1961, by A. P. Aleksandrov, Academician

SUBMITTED: October 16, 1961

Card 3/3

FRANK-KAMENETSKIY, David Al'bertovich; ALYAB'YEV, A.F., red.; VLASOVA, N.A., tekhn. red.

[Plasma, the fourth state of matter] Plazma - chetvertoe sostoianie veshchestva. Izd.2., ispr. Moskva, Gosatomizdat, 1963. 158 p. (MIRA 16:8)
(Plasma (Ionized gases))

ZEL'DOVICH, Yakov Borisovich; RIVIN, Mikhail Abramovich[deceased];
FRANK-KAMENETSKIY, David Al'bertovich; LEYPUNSKIY, O.I., doktor fiz.-mat. nauk, prof., red.; BOGOMOLOVA, M.F., red.izd-va; SKOTNIKOVA, N.N., tekhn. red.

[Jet-power impulse of powder rockets]Impul's reaktivnoi sily porokhovykh raket. Moskva, Oborongiz, 1963. 189 p.
(MIRA 16:3)
(Solid propellant rockets) (Jet propulsion)

Frank-Kamenetskiy, D.A.

Impul's reaktivnoy sily porokhovykh raket (by) Zel'dovich, Ya. B., Rivin, M.A. (1) Frank-Kamenetskiy, D.A. Moskva, Oborongiz, 1963.

189 p. graphs, tables.

Includes bibliographical references.

FRANK-KAMENETSKIY, G.Kh., inzh.

Calculation of round plates strengthened by radial ribbing. Energomashinostroenie 9 no.6:11-14 Je '63. (MIRA 16:9)

FRANK-KAMENETSKIY, D.A.

Trim Nr. 980-12 31 May

ATTENUATION OF MAGNETOACOUSTIC WAVES IN PLASMA (USSR)

Demidov, V. P., D. A. Frank-Kamenetskiy, and V. L. Yakimenko. Zhurnal tekhnicheskoy fiziki, v. 33, no. 4, Apr 1963, 398-405.

S/057/63/033/004/005/021

In an investigation of absorption processes of magnetoacoustic waves propagating at an angle to the constant magnetic field with frequencies higher than ion-cyclotron and much lower than electron-cyclotron ($\omega_i < \omega \ll \omega_e$) in totally ionized thermal plasma, the ion-cyclotron and electron-Cerenkov absorption, as well as absorption resulting from electron-ion collisions, were calculated from general expressions for components of dielectric constant tensor in plasma with Maxwell velocity distribution. It was found that when the ratio of the electronic gas pressure to the magnetic pressure (β_e) is less than 10^{-4}, the ion-cyclotron absorption in the neighborhood of ω_i harmonics is larger than electron-Cerenkov absorption and much smaller than absorption resulting from collisions. If

Card 1/2

ATTENUATION OF MAGNETOACOUSTIC WAVES [Cont'd]

S/057/63/033/004/005/021

$\beta_e \sim 10^{-4}$-10^{-3}, at lower ω_1 harmonics the ion-cyclotron and Cerenkov absorption can be of the same order; at higher harmonics, however, the Cerenkov absorption is much larger than the ion-cyclotron absorption. At $n = 10^{13} cm^{-3}$, $T = 1$ ev, $H_o = 10^3$ oe, and $\beta_e = 4 \cdot 10^{-4}$, the absorption resulting from collisions exceeds the Cerenkov and ion-cyclotron absorption. With an increase in temperature ($\beta_e \sim 10^{-2}$-10^{-1}) the collision absorption decreases and, at higher harmonics, the Cerenkov absorption plays the main role. [JA]

Card 2/2

FRANK-KAMENETSKIY, D.A.

Astrophysical problems of plasma physics. Vop.kosm. 9:70-90 '63. (MIRA 17:5)

L 12913-63 EWT(l)/EWG(k)/BDS/ES(w)-2 AFFTC/ASD/ESD-3/AFWL/SSD
Pz-4/Pi-4/Po-4/Pab-4 AT
ACCESSION NR: AP3001329 S/0057/63/033/006/0703/0709 76

AUTHOR: Demidov, V. P.; Frank-Kamenetskiy, D. A.

TITLE: Dissipation by collisions in a plasma at cyclotron frequency overtones

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 33, no. 6, 1963, 703-709

TOPIC TAGS: plasma, absorption in hot plasmas

ABSTRACT: One of the authors has shown that the index of refraction of a hot plasma for waves propagating transversely to a magnetic field has singularities at the harmonics of the cyclotron frequency (V.P. Demidov, DAN SSSR, 139, 1342, 1961). In the present paper the authors consider the contribution of electron collisions to the absorption of plane electromagnetic waves having frequencies near these harmonics and propagating transversely to a uniform magnetic field in an infinite homogeneous plasma. Only waves polarized with the electric vector parallel to the magnetic field are considered. The dielectric tensor used in the present calculations is taken from the earlier paper, in which collisions were not taken into account. By retaining only the term that is large in the neighborhood of a given overtone of the electron cyclotron frequency and introducing the approximation of "large space dispersion" (wavelength small compared with the distance traveled by an electron as the result of its thermal motion during one cyclotron period divided

Card 1/2

L 12913-63
ACCESSION NR: AP3001329

by the order of the harmonic), an expression is obtained for the index of refraction as a function of the frequency of the wave. Collisions are now taken into account by regarding the frequency in this expression as a complex quantity with its imaginary part equal to the collision frequency. This is assumed to be equivalent to taking collisions into account in the kinetic equation by adding a term equal to the product of the collision frequency by the electron distribution function. The absorption is obtained from the resulting complex index of refraction. A mean absorption coefficient is obtained by averaging over all frequencies. The ratio of this mean absorption coefficient to the known collision absorption coefficient of a cold plasma is large compared with unity whenever the approximations involved in the present calculation (large space dispersion) are valid. In a magnetic field of 1000 oe the present calculations should be valid for electron temperatures above 20 eV. In the same magnetic field, similar calculations involving ionic collisions should be valid at ion temperatures of the order of one keV. Orig. art. has: 35 formulas and 2 figures.

ASSOCIATION: none

SUBMITTED: 28May62 DATE ACQ: 01Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 005 OTHER: 002

Card 2/2

L 18478-63 EWT(1)/EWG(k)/BDS/EEC(b)-2/ES(w)-2 AFFTC/ASD/ESD-3/
AFWL/IJP(C)/SSD Pz-4/Pab-4/Po-4/Pi-4 AT
ACCESSION NR: AP3005500 S/057/63/033/008/0915/0921

80

AUTHOR: Demidov, V.P.; Frank-Kamenetskiy, D.A.

TITLE: Relativistic dissipation in a plasma at harmonics of the cyclotron frequency

SOURCE: Zhurnal tekhnicheskoy fiziki, v.33, no.8, 1963, 915-921

TOPIC TAGS: plasma, dissipation, cyclotron resonance

ABSTRACT: V.P.Demidov (Doklady AN SSSR, 139, 1342, 1961) has shown that when relativistic effects and collisions can be neglected, the refractive index of a plasma for waves propagating transversely to an external magnetic field is singular at the cyclotron frequency and its harmonics. In the present paper the effect of the relativistic variation of the cyclotron frequency with the thermal speed of the electrons is taken into account by averaging the dielectric constant over a Maxwell distribution of electron velocities. In the averaging only one component of the electron velocity is varied; this makes the result uncertain by a factor of 2 or 3, but the order of magnitude should be correct. It is found that the singularities in the refractive index reduce to finite peaks, with the real and imaginary parts of the same order of magnitude. The peaks have heights of the order $(F_p/F_c)^{2/3}/V_{ts}$

Card 1/2

L 18478-63

ACCESSION NR: AP3005500

and widths of the order $F_p^{2/3}F_c^{1/3}v_t$, where F_p is the plasma (Langmuir) frequency, F_c is the cyclotron frequency, V_t is the thermal velocity of the electrons in units of the velocity of light, and s is the order of the harmonic. These results are valid only for a dense plasma ($F_p \gg F_c$) which is so hot and in so strong a magnetic field that collisions may be neglected. The mechanism of the absorption process is discussed briefly. Orig.art. has: 25 formulas and 1 figure.

ASSOCIATION: none

SUBMITTED: 07Jul62 DATE ACQ: 06Sep63 ENCL: 00

SUB CODE: PH NO REF SOV: 014 OTHER: 006

Card 2/2

FRANK-KAMENETSKIY, D.A., prof., doktor fiz.-matem. nauk

Annihilation reversed. Znan.-sila 38 no.6:3 Je '63. (MIRA 16:8)

(Matter--Constitution) (Stars, New)

S/033/63/040/002/005/021
E001/E120

AUTHOR: Frank-Kamenetskiy, D.A.

TITLE: Radiative transfer in the continuous spectrum in the absence of thermal equilibrium

PERIODICAL: Astronomicheskiy zhurnal, v.40, no.2, 1963, 235-244

TEXT: Studies of the physics of plasma indicate that any type of excitation will lead to the formation of suprathermal particles in a plasma which is not too dense. As a result, non-thermal radiation is generated. Such a radiation was indeed discovered from non-stable stars of types UV Ceti and T Tauri, Novae and Supernovae. The purpose of studying non-thermal phenomena in continuous spectra is the detection and interpretation of marked deviations from thermal equilibrium caused by external factors. The transfer equation in a non-equilibrium medium, scattering being neglected, can be written as follows:

$$(\Omega\nabla)I_\nu = \frac{2h\nu^3}{c^2}\sum_m B_m n_m - \left(\sum_m B_m n'_m - \sum_m B_m n_m\right) I_\nu \qquad (3)$$

Card 1/4

where: I_ν is spectral density of radiation in the direction of unit vector Ω, n_m is concentration of electrons in the upper state, n'_m is that in the lower state, B_m is Einstein's absorption coefficient. Approximating to the stellar atmosphere by a plane-parallel layer and introducing a new quantity S_ν, the so-called source function, the transfer equation is integrated over the beam and the following expression obtained:

$$I_\nu(0) = \int_0^{\tau/\mu} S_\nu(\tau')e^{-\tau'/\mu}\frac{d\tau'}{\mu} + I_\nu(\tau)e^{-\tau/\mu} \qquad (8)$$

where $I_\nu(\tau)$ is spectral intensity of the initial flux coming into the layer from below. In a homogeneous layer this equation is reduced to the formula:

$$I_\nu(0) = S_\nu + \left[I_\nu(\tau) - S_\nu\right]e^{-\tau/\mu} \qquad (9)$$

If the optical thickness $\tau > 0$, there are steady-state conditions

for amplification of the radiative flux. Then, at large optical thickness the spectral intensity of the emitted radiation becomes independent of the angle and tends to the source function S_ν. If the energy distribution between electrons is close to Maxwellian at temperature T, but full electron concentration exceeds that which corresponds to ionization equilibrium, the source function S_ν is expressed as follows:

$$S_\nu = \frac{2h\nu^3/c^2}{\frac{[n]}{n} e^{\frac{h\nu}{kT}} - 1} \qquad (17)$$

This leads to non-thermal recombination continua near the limits of the spectral series. The intensity of induced recombination is particularly strong in the infrared region of the spectrum where individual continua should merge together. If a plasma has suprathermal electrons in addition to a thermal background, the source function S_ν has the form:

$$S_\nu = \frac{2h\nu^3/c^2}{\left(\frac{\epsilon}{E_0}\right)^{\gamma-1/2} - 1} \qquad (33)$$

Radiative transfer in the continuous... S/033/63/040/002/005/021
E001/E120

Intensive non-thermal continuous spectrum due to bremsstrahlung can occur only in the hard portion of the spectrum. In the soft region of the spectrum, induced recombination at upper excited levels provides the main contribution to non-thermal radiation. A series of recommendations for analyzing non-thermal spectra are given, using the derived formulas and a graphical method of plotting distribution functions. It is concluded that non-thermal radiation may be due to bremsstrahlung in addition to synchrotron mechanism. The observational tasks and possible astrophysical phenomena where non-thermal radiation can be detected are enumerated, i.e. everywhere in the presence of electromagnetic or gas-dynamical disturbances and, first of all, in all types of non-stable stars.

SUBMITTED: January 20, 1962

Card 4/4

L 18863-63 EWT(1)/EWG(k)/FCC(w)/BDS/EEC(b)-2/ES(v)/ES(w)-2 AFFTC/ASD/ESD-3/SSD Pz-4/Pe-4/Pab-4/Pi-4/Po-4 AT/GW/JFW

ACCESSION NR: AP3001239 S/0033/63/040/003/0455/0465

93
86

AUTHOR: Frank-Kamenetskiy, D. A.

TITLE: Plasma phenomena and supernova outburst

SOURCE: Astronomicheskiy zhurnal, v. 40, no. 3, 1963, 455-465

TOPIC TAGS: supernova, outburst, stellar contraction, neutroplasma, electric polarization, electric energy, magnetic energy, epi-gravitation, epiplasma, gravitational radius, nonthermal radiation, annihilation, matter-antimatter

ABSTRACT: This theoretical paper examines the physical processes occurring during the contraction of a star devoid of internal energy sources prior to a supernova outburst. A "neutronization" process results in the formation, within the central zone of the star, of a solution of plasma in the neutron fluid ("neutroplasma"). In an alpha-neutroplasma the electron charge is compensated by helium nuclei, in a beta-neutroplasma by positrons produced by equilibrium lepton-pair formation. The electric conductivity of neutroplasma is very great. Electric polarization is produced in a region of alpha-neutroplasma by the gradient of electron pressure. In the transitional layer between the nucleus and the envelope of the star the convective motion within the electrical field leads to the transformation of the contrac-

Card 1/2

L 18863-63

ACCESSION NR: AF3001239

tion energy into magnetic energy. The magnetic pressure thus developed provides the impulse for supernova outbursts of type I. In supernovae of type II the radius approaches the value of the gravitational radius before nuclear density is achieved; this leads to epi gravitational phenomena in which gravitational and strong interactions occur simultaneously. The most important of these phenomena is the formation of "epiplasma" (a mixture of nucleons and antinucleons, stabilized by elevated temperature and the gravitational field). A body consisting of epiplasma is unstable with respect to local unsymmetrical reductions in density which lead to annihilation. Such epi gravitational instability provides the impulse for type-II supernova outbursts. The annihilation of epiplasma in post-outburst supernova remnants may provide the necessary energy for a number of processes of nonthermal radiation. It should be noted that the epiplasma exhibits certain properties which V. A. Ambartsumyan attributed to his hypothetical "prestellar matter" (Byurakansk. observ., Soobshch., no. 13, 1954). "I thank Ya. B. Zel'dovich, L. E. Gurevich, B. P. Konstantinov, S. B. Pikel'ner, I. S. Shklovskiy, and I. M. Shmushkevich for valuable comments." There are 56 numbered equations.

ASSOCIATION: none

SUBMITTED: 20Jan61	DATE ACQ: 01Jul63	ENCL: 00
SUB CODE: AS, PH	NO REF SOV: 011	OTHER: 006

Card 2/2

FRANK-KAMENETSKIY, D.A., prof.

A stable plasma. Priroda 52 no.8:13-19 Ag '63. (MIRA 16:9)
(Plasma (Ionized gases))

FRANK-KAMENETSKIY, D.A., prof. (Moskva)

Origin of the elements of the solar system. Priroda 52 no.11: 17-26 '63.

Luminescence during the splitting of solids. Ibid.:72 (MIRA 17:1)

FRANK-KAMENETSKIY, D.A., prof. (Moskva)

Searching for the solution of the cosmic ray mystery.
Priroda 52 no.12:111 '63. (MIRA 17:3)

SEDUNOV, B.I.; FRANK-KAMENETSKIY, D.A.

Dielectric permeability of biological objects. Usp. fiz. nauk 79 no.4:617-639 Ap '63. (MIRA 16:3)
(Dielectric constant) (Biophysics)

KOLESNIK, I.G.; FRANK-KAMENETSKIY, D.A.

Analysis of energy distribution near the Balmer limit in spectra of nonstable stars. Astron.zhur. 41 no.1:178-181 Ja-F '64. (MIRA 17:4)

1. Glavnaya astronomicheskaya observatoriya AN UkrSSR.

NADEZHIN, D.K.; FRANK-KAMENETSKIY, D.A.

Acceleration of particles at the analog emergence of a shock wave at a plasma surface. Fiz. plazmy 41 no.5:842-845 S-O '64. (MIRA 17:10)

SULIDI-KONDRAT'YEV, Ye.D. (Moskva); KOZLOV, V.V. (Moskva); TAMRAZYAN, G.P. (Baku); FRANK-KAMENETSKIY, D.A., prof. (Moskva)

Articles on geological cycles. Priroda 53 no.1:102-111 '64. (MIRA 17:2)

FRANK-KAMENETSKIY, D.A., prof. (Moskva)

"Introduction to molecular biology" by S.E.Bresler. Reviewed by D.A. Frank-Kamenetskii. Priroda 53 no.3:121-122 '64. (MIRA 17:4)

SMORODINSKIY, Ya.A.; FRANK-KAMENETSKIY, D.A.

IAkov Borisovich Zel'dovich, 1914 - ; on his 50th birthday.
Usp. fiz. nauk 82 no.3:567-574 Mr '64. (MIRA 17:4)

FRANK-KAMENETSKIY, M.D.

Theoretical considerations concerning the effect of different factors on the thermal denaturation of DNA. Dokl. AN SSSR 157 no.1:187-190 Jl '64 (MIRA 17:8)

1. Institut atomnoy energii im. I.V. Kurchatova. Predstavleno akademikom M.A. Leontovichem.

EWT(l)/EWP(m)/EWG(k)/EPA(sp)-2/EWG(v)/EPA(w)-2/EWT(t)/T/EWG(b)-2/
[illegible]/Pd-4/Pe-5/Pi-4/Pz-4/Pab-14/Pac-[illegible]
S,SL(s)/ASD(f)-2/AEDC(a)/AFTR/ESD(t) AT/GW

ACCESSION NR: AT4049115 S/2555/64/010/000/0154/0178

AUTHOR: Nadezhin, D. K.; Frank-Kamenetskiy, D. A.

B+1

TITLE: Propagation of shock waves in polytropic gas spheres

SOURCE: AN SSSR. Astronomicheskiy sovet. Voprosy* kosmogonii, v. 10, 1964. Problemy* magnitnoy gidrodinamiki i kosmicheskoy gazodinamiki (Problems in magnetic hydrodynamics and cosmic gas dynamics), 154-178

TOPIC TAGS: magnetic hydrodynamics, astrophysics, shock wave propagation, polytropic gas sphere, stellar model

ABSTRACT: The article deals with the results obtained from using the method of fictitious viscosity to calculate the adiabatic motion of strong shock waves in spherically symmetric polytropic stellar models. The partial differential equations for spherically symmetric motion of an ideal gas were integrated by means of (computer) solutions of the corresponding finite difference equations. The adiabatic index was taken at 5/3. The following cases of perturbation of stationary models (polytropes with indexes n = 1.5 and n = 3.0) were considered: 1) inward velocity i m p a r t e d t o

Card 1/3

L 16284-65

ACCESSION NR: AT4049115

matter n e a r the center (central collapse); 2) contraction of a layer near the periphery; 3) cooling of the central region of the star. All such perturbations led to the formation of a shock wave. When this wave reaches the surface of the star, a certain fraction of the stellar matter acquires escape velocity, which leads to formation of an envelope. This envelope has a steep velocity gradient and the density of the matter in the envelope decreases exponentially with increasing distance from the center. A series of calculations was carried out with different strengths of perturbations. The strongest perturbations would lead to total disintegration of the star and the weakest would cause ejection of about 10^{-6} of the total mass of the star. The calculations made it possible to find a relationship between the kinetic energy of the expanding envelope and its mass which can be approximated quite well by a power function. It depends only slightly on the form of perturbation. The latter feature makes it possible to apply this relation to computing the masses of novas. For fast novas of the NAql 1918 and NPer 1901 type, the masses turn out to be on the order of several solar masses, and for slow novas of the N Aur 1891 and N Her 1934 type, on the order of 0.2—0.02 solar masses. After the shock wave

Card 2/3

L 10284-65
ACCESSION NR: AT4049115

escapes and the envelope is formed, the bulk mass of the star pulsates with a frequency approximated by the fundamental mode as computed by linear pulsation theory. The principal results of the calculations are presented in tables and graphs. Orig. art. has: 14 figures and 2 tables.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: ME, AA

NO REF SOV: 008 OTHER: 009

Card 3/3

MATSONASHVILI, B.N., FRANK-KAMENETSKIY, D.A., prof., otv. red.

[In the depths of the atom] V glub' atoma; sbornik statei. Moskva, Nauka, 1964. 391 p. (MIRA 18:2)

1. Akademiya nauk SSSR. 2. Zamestitel' glavnogo redaktora zhurnala "Priroda" (for Frank-Kamenetskiy)

AM5007577

BOOK EXPLOITATION

UR/
533.9 (075.8)

Frank-Kamentskiy, David Al'bertovich

Lectures on plasma physics (Lektsii po fizike plazmy). Moscow, Atomizdat, 1964. 0282 p. illus., biblio. Errata slip inserted. 12,000 copies printed.

TOPIC TAGS: plasma physics, plasma, strong magnetic field, plasma interaction, thermodynamics, particle trajectory, plasma oscillation, plasma wave

PURPOSE AND COVERAGE: The book is based on a course of lectures given by the [illegible] at the Moscow Institute of Technical Physics. [illegible] given a general [illegible] of the properties of plasma and aff[illegible] attention to the interaction between plasma and strong magnetic fields. The book serves as a text for students at faculties and institutes of technical physics.

TABLE OF CONTENTS (abridged):

Foreword -- 3
Ch. I. Basic concepts -- 9

Card 1/2

AM5007577

SUBMITTED: 21Aug64 NO REF SOV: 009

ENCL: 01

Card 2/2

L 35480-65 EWT(m)/EWA(b) RM
ACCESSION NR: AP5005606 S/0190/65/007/002/0354/0361

AUTHOR: Frank-Kamenetskiy, M. D.

TITLE: Theory of helix-coil transition for desoxyribonucleic acid with additional interchain bonds

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 2, 1965, 354-361

TOPIC TAGS: desoxyribonucleic acid, melting point, phase transition

ABSTRACT: Existing views indicate that the bihelical molecule of DNA forms a homogeneous crystal. On heating, the ordered structure breaks down and changes to a "fluid state"--a disoriented coil. This transition strongly suggests the fusion of an ordinary three-dimensional crystal, but it is not a true phase transition. A great number of substances are known that will lower the fusion point of DNA when added to a solution of that material. Some also change the melting interval. These substances either increase or decrease the binding energy of the nucleotides. The author calls such substances "clips." He seeks to compute the dependence of melting point and melting-temperature range of DNA on the concentration of these "clips" (in the first approximation of this concentration). The problem involves finding the temperature dependence of the number of bound

Card 1/3

pairs. This was done by statistical summation. Expressions were found for the average number of bound pairs, and these were applied to specific cases for "clips" of dye molecules, ionized bases, and G-C pairs. The generalized formulas for melting point and temperature range are:

$$\delta T_m = 2\frac{p-1}{p+1}\frac{T_0^2}{U}\frac{2D}{P},$$

$$\delta\Delta T = \left[4\left(\frac{p-1}{p+1}\right)^2 - 8\sqrt{\sigma}\frac{p-1}{p+1}\right]\frac{T_0^2}{U}\frac{2D}{P},$$

where D is the complete concentration of clips in solution (both free and bound with DNA), P is the concentration of nucleotides in DNA, σ is the cooperative factor (where F_2 is the free energy of interaction between neighboring links in the chain), T_0 is the melting point of pure DNA, $p = e^{\Delta/T}$, U is the difference in bond energy between complementary chains of the double helix, and Δ is the free energy added by the clips. "The author expresses his sincere thanks to A. A. Vedenov and Yu. S. Lazurkin for their guidance in the work." Orig. art. has: 2 figures and 40 formulas.

L 35480-65

ACCESSION NR: AP5005606

ASSOCIATION: none

SUBMITTED: 10Jul64 ENCL: 00 SUB CODE: OC, LS

NO REF SOV: 006 OTHER: 010

Card 3/3

L 35481-65 EWT(m)/EWA(b) RM

ACCESSION NR: AP5005607 S/0190/65/007/002/0362/0365

AUTHORS: Permogorov, V. I.; Frank-Kamenetskiy, M. D.; Serdyukova, L. A.; Lazurkin, Yu. S.

TITLE: Determining heats of helix-coil transition from the melting curves of desoxyribonucleic acid having additional interchain linkages

SOURCE: Vysokomolekulyarnyy soyedineniya, v. 7, no. 2, 1965, 362-365

TOPIC TAGS: desoxyribonucleic acid, binding energy, dye, nucleotide

ABSTRACT: There are as yet no reliable data on the binding energy of the complementary chains in the double helix of DNA. This is due chiefly to the experimental difficulty of direct microcalorimetric determination. The authors worked out a method of determining the binding energy by introducing into DNA a small number of local intermolecular or covalent supplementary bonds (or clips) between the complementary chains. When a dye (actinomycin or acridine orange) acts on DNA, the melting curve of DNA changes characteristically. The melting point and the melting-temperature range increase. If all dye molecules introduced into the solution are bound to DNA so that each clip is formed by one dye molecule, the clip concentration is determined by the formula $c = 2D/P$, where D is the molar concen-

Card 1/2

L 35481-65

ACCESSION NR: AP5005607

tration of the dye and P is the molar concentration of DNA nucleotides. By measuring the dependence of the melting point and melting range on this concentration, it is possible to determine from simple formulas the binding energy and the additional energy. This requires, however, that, as the DNA melts, the dye must not go into solution but stay bound to the DNA molecules. This condition is essential only till melting reaches 60-70%, and it was found that actinomycin, proflavine, and acridine orange meet it at low ionic strength of the solution. Results show that the heat of the helix-coil transition in DNA depends markedly on the ionic strength of the solution. At a melting point of 55C, this heat of transition is 2.7 ± 0.7 kcal/mole. Orig. art. has: 1 figure, 1 table, and 2 formulas.

ASSOCIATION: none

SUBMITTED: 19Jul64 ENCL: 00 SUB CODE: OC, LS

NO REF SOV: 008 OTHER: 001

Card 2/2

L 31344-65 EWT(m)/EWP(j) Pc-4 RM

ACCESSION NR: AP5005998 S/0217/65/010/001/0105/0109

37
36
B

AUTHOR: Lystsov, V. N.; Frank-Kamenetskiy, D. A.; Shchedrina, M. V.

TITLE: The effect of centimeter radio waves on vegetative cells, spores, and DNA transformation

SOURCE: Biofizika, v. 10, no. 1, 1965, 105-109

TOPIC TAGS: microwave , SHF, biological effect, mutagenesis, bacteria, DNA transformation, thermal effect

ABSTRACT: The authors investigated the effects of SHF on cooled (-196C) and normal-temperature molecular and cellular preparations. The purpose of the experiment was to observe how SHF affected DNA transformation and the condition of cells and bacterial spores. Samples were placed in test tubes located in the horn of a magnetron generator antenna. The pulsed radiation had the following characteristics: λ = 9370 Mc, R_{imp} = 17 kw, τ_{imp} = 10 sec, F = 500 cps, E_{ant} = 600 v/cm. Liquid nitrogen (-196C) flowed through a foam-polystyrene holder. The method of cooling the samples, which never varied, involved inserting the test tubes into the holder. The maintainance of -196C throughout an entire radiation session was judged as a function of the condensed liquid nitrogen which accumulated in the test tubes above the samples. In some tests, samples were irradiated without cooling. In these

Card 1/3

cases, the temperature of the test-tube liquid was measured with a thermocouple. A figure in the original article shows how the test-tube temperature depended upon the duration of SHF irradiation. Heating of samples took place in a bath where the water was vigorously circulated. In spite of the fact that a high-powered, pulsed SHF field was used, the authors could not detect a specific (nonthermal) or mutagenic effect. Frozen bacterial preparations exposed to SHF showed a slightly higher survival percentage than their control. This increase in survival, which sometimes surpassed that of the control samples, could be explained either as a function of the destruction of bacterial aggregates by SHF, or, less likely, as a manifestation of the stimulating effect of SHF, observed in previous experiments. Although the fundamental effect of SHF on nonfrozen suspensions was thermal, there was a complete inactivation by SHF of metabolizing vegetative cells in contrast to nonmetabolizing spores. This is in agreement with another investigator's findings that ultra-shortwave irradiation deactivated enzymes. Consequently, it is possible to conclude that high-amplitude, high-frequency, electromagnetic fields do not evoke a specific (nonthermal) affect on the genetic mechanism of cells. However, such fields may directly affect metabolic and enzymatic processes. Orig. art. has: 2 figures and 1 table. [CD]

ASSOCIATION: Institut atomnoy energii imeni I. V. Kurchatova, Moscow (Institute of Atomic Energy)

L 31344-65

ACCESSION NR: AP5005998

SUBMITTED: 26Mar64 ENCL: 00 SUB CODE: LS, GC

NO REF SOV: 007 OTHER: 009 ATD PRESS: 3201

Card 3/3

EWT(1)/EWP(m)/EWC(v)/EWA(d)/EPR/EEC(t)/FCS(k)/EWA(h)/EWA(c) Pd-1/
Pad-2/Pi-4 WW/GW

ACCESSION NR: AP5010430 UR/0033/65/042/002/0290/0298

AUTHORS: Nadezhin, D. K.; Frank-Kamenetskiy, D. A.

TITLE: The propagation of shock waves in the outer layers of a star 44 B

SOURCE: Astronomicheskiy zhurnal, v. 42, no. 2, 1965, 290-298

TOPIC TAGS: star, shock wave, nova, gasdynamics, self similarity model

ABSTRACT: A numerical solution of gas dynamics equations is used to examine the envelope of shock waves expelled during outbursts of novae. It is shown that the main mass of gas joins the envelope during the expansion stage of the surface layers, after the emergence of the shock wave to the surface. The characteristics of the envelope do not depend on the nature of origin of the shock wave in the deeper layers. The approximation methods of Chisnell-Whitham and Brinkley-Kirkwood were used to compute propagation of the shock wave. The latter method satisfactorily describes the path of the shock-wave front in addition to that path in the deeper layers, where the strength of the wave is overstated. The first method, however, gives an entirely unreliable picture of the movement of the shock wave. Both methods, when used in the region where the self-similarity solution is valid, lead to practically identical results, very near the exact

Card 1/2

L 47296-65

ACCESSION NR: AP5010430

solution. The authors conclude by emphasizing that, since the envelope forms after emergence of the shock wave, the Brinkley-Kirkwood and Chisnell-Whitham approximation methods cannot be used to find the mass of the expelled envelope. Only change in mass may be found. Orig. art. has: 2 figures, 3 tables, and 35 formulas.

ASSOCIATION: none

SUBMITTED: 13Jun64 ENCL: 00 SUB CODE: AA

NO REF SOV: 003 OTHER: 015

KOVAN, I.A.; KOZOROVITSKIY, L.L.; RUSANOV, V.D.; SMIRNOV, V.P.; FRANK-KAMENETSKIY, D.A.

Magnetoacoustic resonance in a toroidal system. Zhur. eksp. i teor. fiz. 48 no.1:72-77 Ja '65. (MIRA 18:4)

L 20385-66 EWT(l)/ETC(f)/EPF(n)-2/EWG(m)/ETC(m)-6 IJP(c) WW/AT
ACC NR: AT6001560 SOURCE CODE: UR/3136/65/000/911/0001/0020

AUTHOR: Kovan, I. A.; Podgornyy, I. M.; Rusanov, V. D.; Smirnov, V. P.; Spektor, A. M.; Frank-Kamenetskiy, D. A.

ORG: Institute of Atomic Energy im. I. V. Kurchatov (Institut atomnoy energii)

TITLE: Magnetosonic heating of a plasma

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-911, 1965. Magnitnozvukovoy nagrev plazmy, 1-20

TOPIC TAGS: magnetoacoustic effect, magnetoactive plasma, plasma resonance, plasma waveguide, plasma oscillation, plasma heating, magnetic trap/ Vega

ABSTRACT: The authors present results of a study of excitation, propagation, and absorption of oblique magnetic-sound waves in a hydrogen or helium plasma at 10--30 Mcs. More attention than in the past is paid to the excitation of magnetic-sound waves, and particularly magnetic-sound resonance in a confined plasma. Various experiments with direct magnetic-sound waves are discussed and experiments aimed at heating plasma with the aid of oblique waves and magnetic-sound resonance are described. A "Vega" adiabatic trap with high frequency source of cold plasma, designed for this purpose is briefly described. The plasma in these experiments was produced by high frequency discharge, using generators operating at 20--50 Mcs

Card 1/2

L 20385-66

ACC NR: AT6001560

4

with a nominal power of ~200 kw. The transverse field was produced by discharging a capacitor through a solenoid. The magnetic-field pulse was 20 msec. The investigations have shown that when beyond-cutoff plasma-waveguide conditions are produced resonance accumulation of energy is possible in the plasma column when the magnetic sound wave propagates almost transverse to the static magnetic field. This phenomenon is treated as magnetic-sound resonance at lower radial modes. The spatial amplification obtained in strong magnetic fields corresponds to a resonator Q ~ 15, assuming that only transverse waves are excited in the resonator. This value of Q is limited by dissipative mechanisms, particularly nonlinear processes. The study of the oblique magnetic-sound waves has shown that the dissipative processes can be more intense here and that in the case of nonstationary waves of large amplitude a nonlinear dissipation, connected with collective mechanisms, can arise. The experiments have also shown that such a wave can be used to transfer energy effectively to the electronic component. The two plasma heating methods considered (resonant and shock-wave) can be particularly promising for the production of hot plasma in toroidal traps. The authors thank Ye. K. Zavoyskiy, M. A. Leontovich, B. B. Kadomtsev, and V. D. Shafranov for numerous discussions.
Orig. art. has: 11 figures and 11 formulas.

SUB CODE: 20/ SUBM DATE: none / ORIG REF: 028/ OTH REF: 003

Card 2/2 BK

ACC NR: AT6033188 SOURCE CODE: UR/3136/66/000/103/0001/0019

AUTHOR: Frank-Kamenetskiy, D. A.

ORG: State Committee for Exploitation of Atomic Energy SSSR, Institute of Atomic Energy im. I. V. Kurchatov (Gosudarstvennyy komitet po ispol'zovaniyu atomnoy energii SSSR, Institut atomnoy energii)

TITLE: A physical interpretation of the magnetohydrodynamic description of a plasma

SOURCE: Moscow. Institut atomnoy energii. Doklady. IAE-1103, 1966. O fizicheskoy interpretatsii magnitogidrodinamicheskogo opisaniya plazmy, 1-19

TOPIC TAGS: magnetohydrodynamics, plasma dynamics, thermal diffusion

ABSTRACT: The introductory section of the article deals with the single component and the multicomponent formulations of the magnetohydrodynamics of a plasma. A mathematical description is then formulated for the case of steady state three component magnetohydrodynamics, followed by an analogous treatment for the case of unsteady state multicomponent magnetohydrodynamics. The mathematical theory is further refined by taking into account fictitious forces, thermal forces, and thermodiffusion. The article concludes with a comparison of the results with kinetic theory. The method expounded permits including in the magnetohydrodynamic system all forms of drift motion and transport processes, including thermal diffusion. The

Card 1/2

ACC NR: AT6033188

overall structure of the equations agrees in general with the approximations of kinetic theory. A more accurate description of thermal diffusion processes demands the introduction of such quantities as the partial heat fluxes which, in principle, are not measurable experimentally, and which greatly complicate the calculations. Orig. art. has: 49 formulas.

SUB CODE: 20/ SUBM DATE: none/ ORIG REF: 010

Card 2/2

L 07849-67 EWT(1)/EWT(m) GW/WS-2
ACC NR: AP6028037 SOURCE CODE: UR/0025/66/000/005/0070/0073

AUTHOR: Frank-Kamenetskiy, D. (Professor) 36 35 B

ORG: none

TITLE: What is nuclear astrophysics? 19

SOURCE: Nauka i zhizn', no. 5, 1966, 70-73

TOPIC TAGS: astronomy, astrophysics, nuclear physics

ABSTRACT: The scope of nuclear astrophysics, a new branch of science which borders on nuclear physics and the sciences of the cosmos is discussed. Among its problems are the sources of stellar energy, origin of elements and the chemical evolution of the universe. It is closely associated with cosmic chemistry in probing the chemical composition of meteorites, the sun, stars and interstellar gas of the whole universe. Many questions regarding the reactions and composition of bright stars have already been answered. The nuclear astrophysicist makes calculations basic for theories on the inner structure and evolution of stars. One of its future problems in conjunction with neutrino astronomy will be the capture of solar and cosmic neutrinos, to provide information on the isotopic composition of cosmic materials. Nuclear astrophysics is necessary in conjunction with planetary cosmogony for studying the formation of the solar system and with general cosmology for studying the structure and growth of the

17

Card 1/2

L 07849-67

ACC NR: AP6028037

whole universe. The nuclear astrophysicist works with radioastronomy, which leads to finding quasars. Orig. art. has: none.

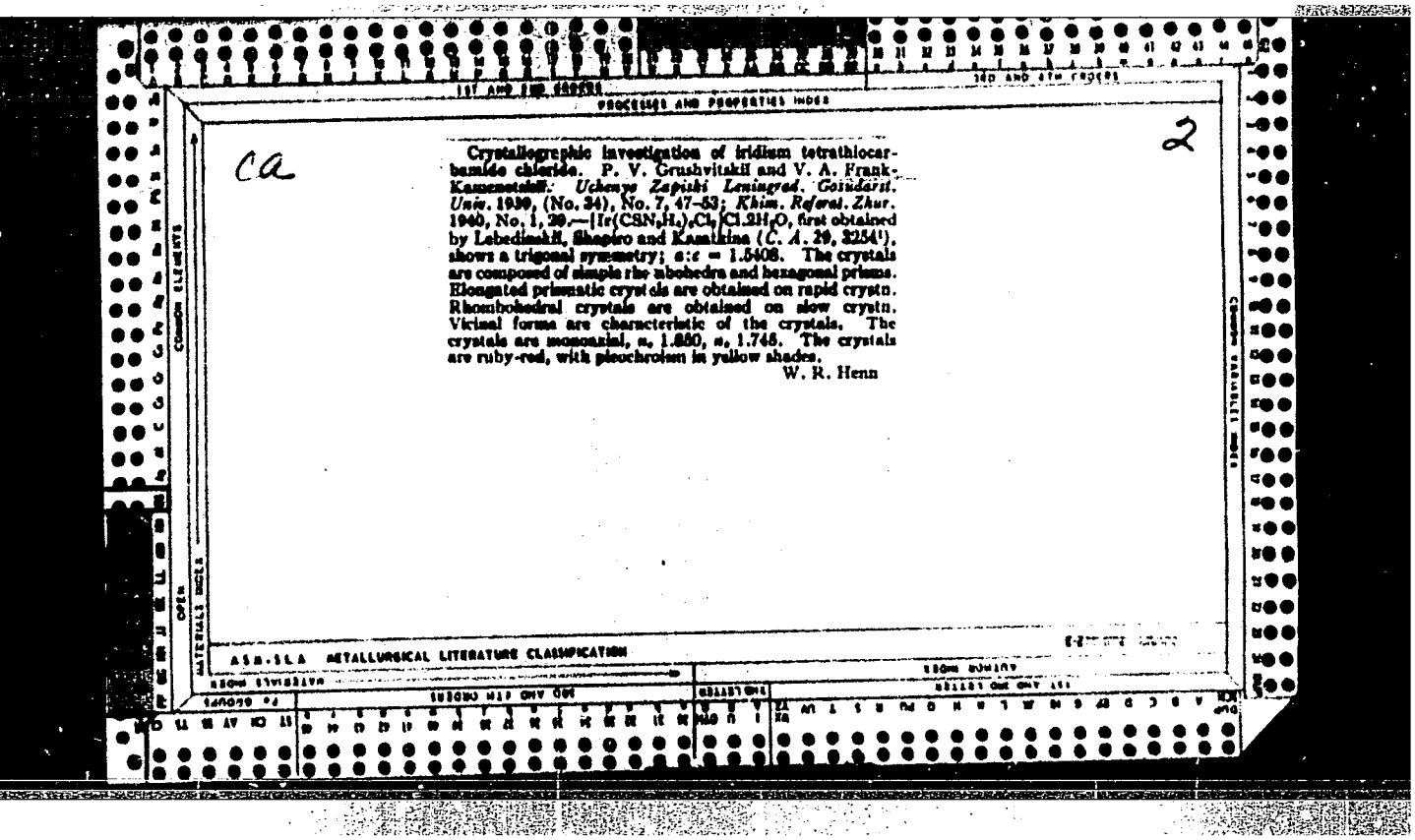
SUB CODE: 03,20/ SUBM DATE: none

Card 2/2 mc

FRANK-ZABLUDOVSKAYA, T. F.; FRANTSEVICH, I. N.; KHRUSHCHOVA, T. F.

"Cathodic Protection of Gas Mains" (Katodnaya zashchita magistral'nykh gazoprovodov), AS USSR, 1949, 80 pp.

Institute of Ferrous Metallurgy, AS USSR



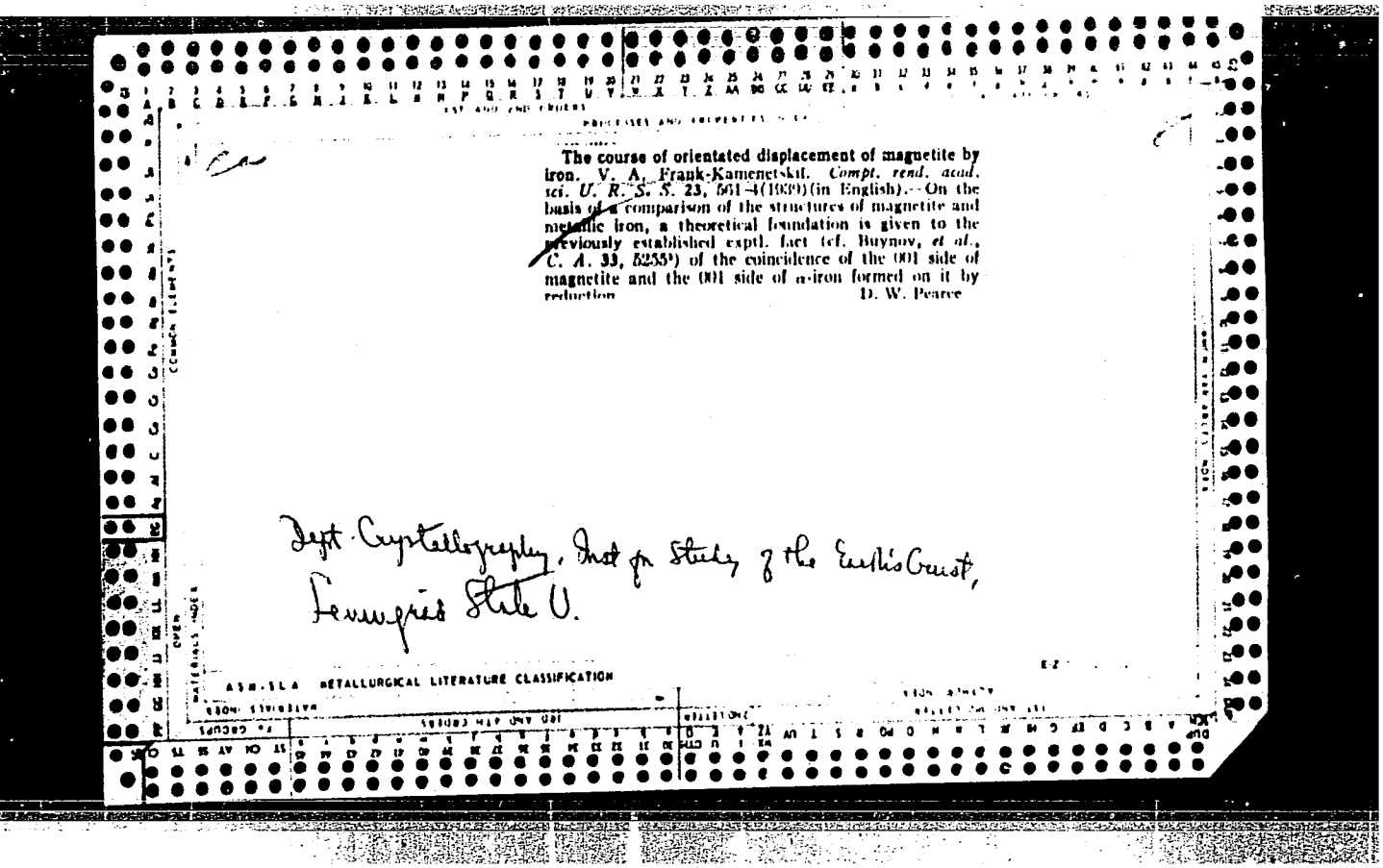
Ca

2

Crystallographic investigation of iridium tetrathiocarbamide chloride. P. V. Grushvitskii and V. A. Frank-Kamenetskii. *Uchenye Zapiski Leningrad. Gosudarst. Univ.* 1939, (No. 34), No. 7, 47–53; *Khim. Referat. Zhur.* 1940, No. 1, 39.—$[Ir(CSN_2H_4)_4Cl_2]Cl.2H_2O$, first obtained by Lebedinskii, Shapiro and Kamtskina (*C. A.* 29, 3254[1]), shows a trigonal symmetry; $a:c = 1.5408$. The crystals are composed of simple rhombohedra and hexagonal prisms. Elongated prismatic crystals are obtained on rapid crystn. Rhombohedral crystals are obtained on slow crystn. Vicinal forms are characteristic of the crystals. The crystals are monoaxial, n_o 1.880, n_e 1.745. The crystals are ruby-red, with pleochroism in yellow shades.

W. R. Henn

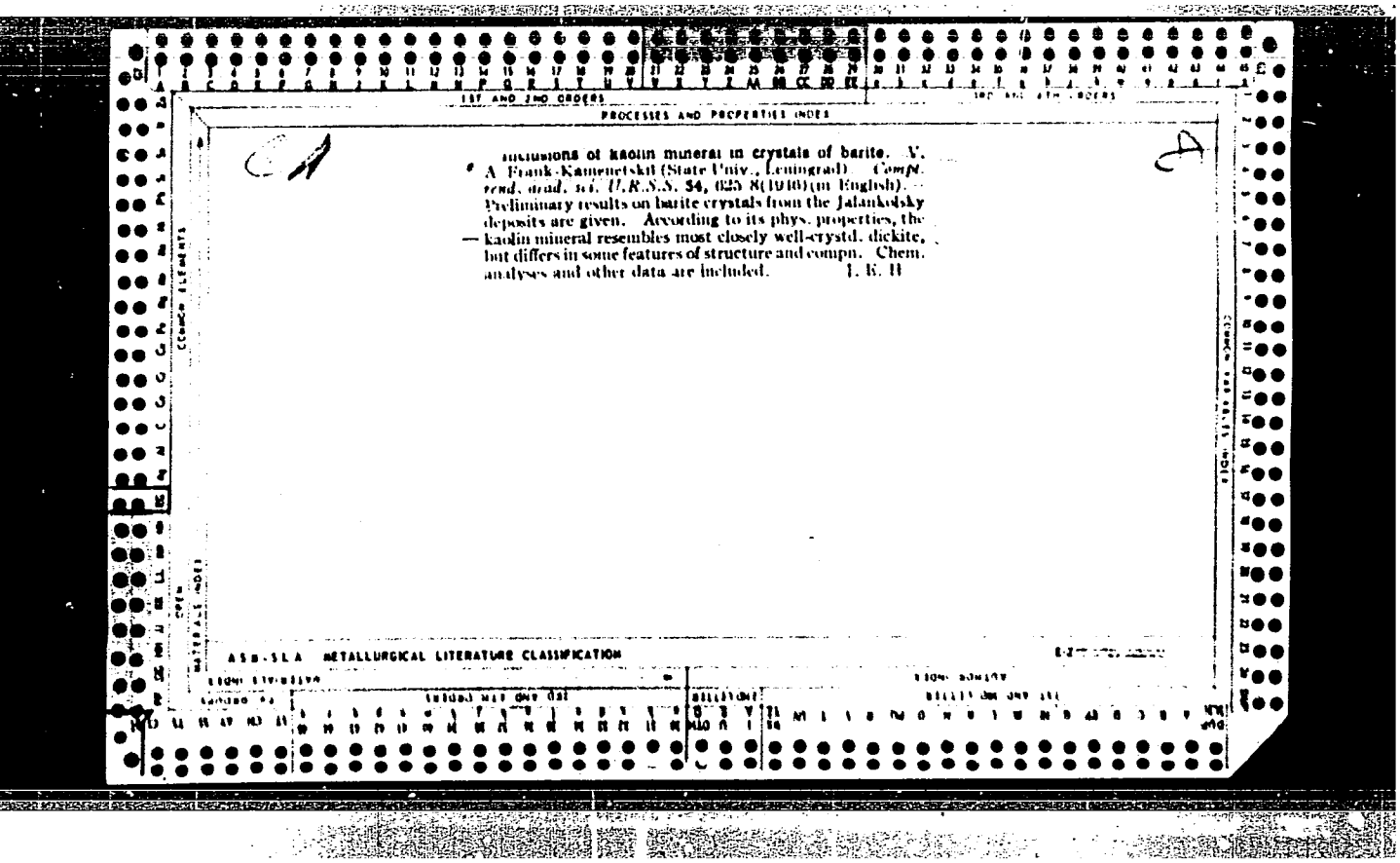
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



The course of orientated displacement of magnetite by iron. V. A. Frank-Kamenetskii. *Compt. rend. acad. sci. U. R. S. S.* **23**, 561–4 (1939) (in English).—On the basis of a comparison of the structures of magnetite and metallic iron, a theoretical foundation is given to the previously established exptl. fact (cf. Buynov, *et al.*, *C. A.* **33**, 8255[9]) of the coincidence of the (001) side of magnetite and the (001) side of α-iron formed on it by reduction. D. W. Pearce

Dept. Crystallography, Inst. for Study of the Earth's Crust, Pennsylvania State U.

A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

inclusions of kaolin mineral in crystals of barite. V. A. Frank-Kamenetskii (State Univ., Leningrad). *Compt. rend. acad. sci. U.R.S.S.* **54**, 625-8(1946)(in English). Preliminary results on barite crystals from the Jalankulsky deposits are given. According to its phys. properties, the kaolin mineral resembles most closely well-crystd. dickite, but differs in some features of structure and compn. Chem. analyses and other data are included. I. R. H

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

KAMENETSKY, FRANK- V. A.

USSR/Minerals - Witherite Mar 1946

"Witherite from Baryte Veins in the North Caucasus (Arkhyz and Djalankol Deposits)," V A Frank-Kamenetzky, 6 pp

"Zap Mineral Obshch USSR" Vol 65, No 3

Chemical and optical properties of witherite collected by the author

2T67

CA

Witherite from barite veins in the northern Caucasus (Arkhyz and Dzhalankol). V. A. Frank-Kamenetskii (Leningrad State Univ.). *Zapiski Vsesoyuznogo Mineral. Obshchestva* (*Mém. soc. russe minéral.*) 75, 181-6(1946); *Chem. Zentr.* 1948, I, 144.—The av. compn. of the barite deposit of Arkhyz is: BaO 59.32, SO_3 34.14, and SrO 4.10%. Large aunts. of cryst., globular specimens of witherite ($BaCO_3$) 10-12 cm. in diam. are found in this deposit. Their compn. varies within the following limits: BaO 73.90-5.55, CO_2 22.10-2.28, and SrO 1.40-2.60%. These crystals show the following optical properties: biaxially neg., $-2V = 15°$, $Ng = 1.677$, $Np = 1.529$. The barite deposit of Dzhalankol differs from that of Arkhyz in that the witherite occurs as fine needles in the breccia of the barite vein or on the periphery thereof. These crystals are 2-4 mm. long and a few tenths of a mm. thick. Optical properties: biaxially neg., $Ng = 1.679$, and $Np = 1.530$.

M. G. Moore

FRANK-KAMANETSKIY, V. A., DOCENT

PA 4/49T71

USSR/Physics
Crystallography
Crystal Structures

Jan 48

"The External Form of Crystals as an Indication of Their Internal Structure," Prof I. I. Shafranovsky, Docent V. A. Frank-Kamanetskiy, 33 pp
Chair Crystallography, Leningrad State U.
"Vest Leningrad U" No 1

Theoretical survey of subject: (1) introduction; (2) history of the problem; (3) space lattice, symmetry and external form of crystals; (4) [page missing]; (5) real structure and form of crystals; (6) conclusion.

4/49T71

CA

X

Succession of barite crystal growths. V. A. Frank-Kamenetskii. *Zapiski Vsesoyuz. Mineral. Obshchestva* 78, 182-6 (1949).—The paragenetic laws of mineral succession are discussed according to the views of Vernadskii (*C.A.* **20**, 3073) and of Grigoriev, with as an example the barite cryst... in veins of Dzhaluskol (North Caucasus). The great difference of the crystal habit in the first and second principal generation in this deposit is a consequence of the fundamental changes in the chem. compn. of the assocd. solns. The first generation which can be subdivided in 3 substeps, is characterized by a pinacoidal barite of milky-white or transparent type, with numerous finest inclusions of liquid, and detd. by the strong tectonic phenomena (along typical fault lines, and with numerous cavities). The second generation is characterized by the entirely different (tabular) crystal habit, and is typical for carbonate mineralizations accompanying the barite.

W. B.

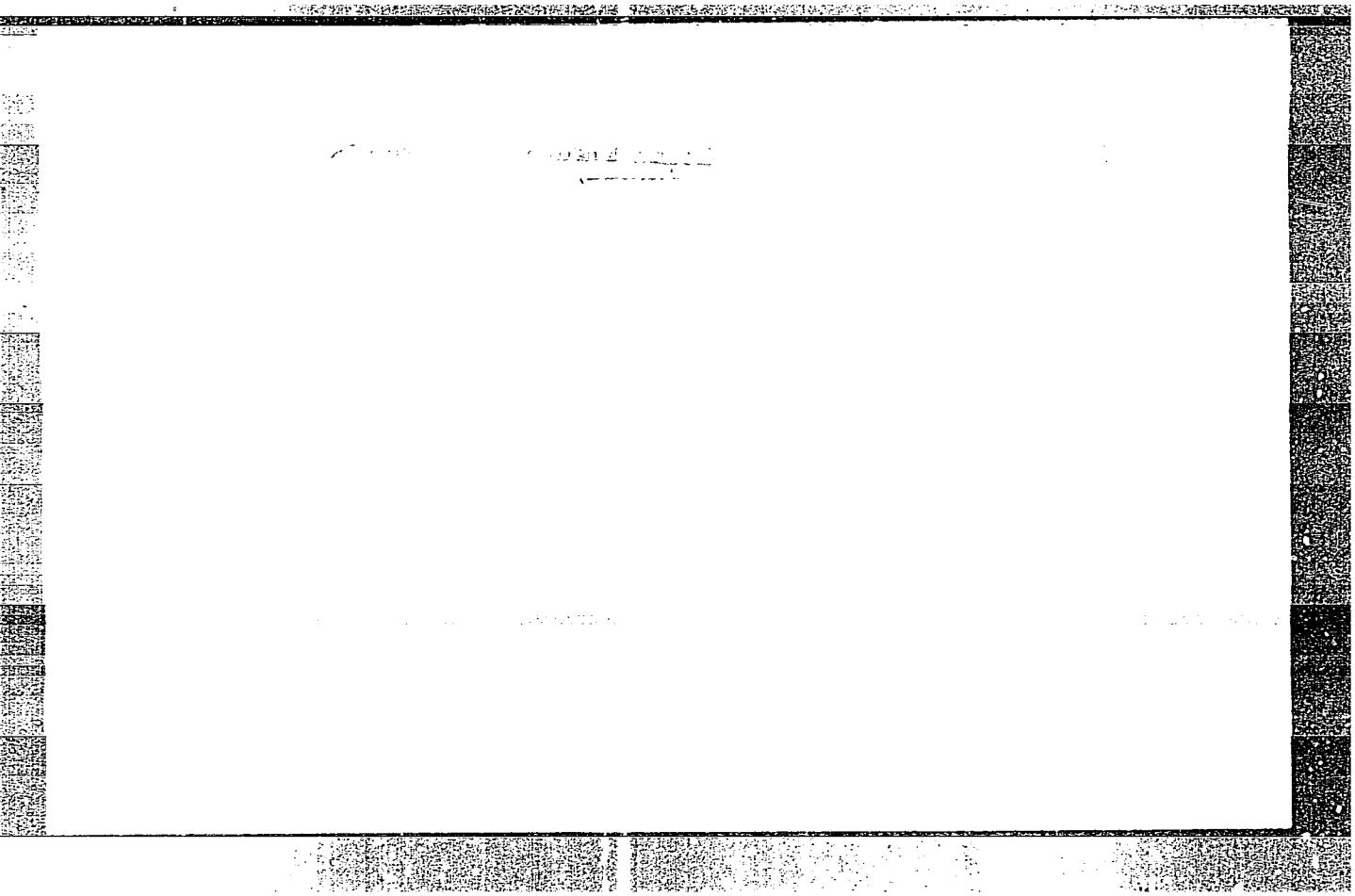
FRANK-KAMENETSKIY, VA.

Argillaceous mass in gangue of barite veins of Dzhalankol. Uch.zap. Len.un. no.102:142-162 '50. (MLRA 10:1)

1. Kafedra kristallografii Leningradskiy Gosudarstvennyy ordena Lenina universitet imeni A.A.Zhdanova.
(Dzhalankol--Clay)

CA

Barite from the upper river Kuban. V. A. Frank-Kamenetskii (Leningrad State Univ.). *Zapiski Vsesoyus. Mineral. Obshchestva* (Mém. soc. russe minéral.) **80**, 33-47(1951). A detailed description of the barite from the Kuban occurrences (barite belt of the N. Caucasus) is given, especially from the veins in the valleys of Dzhalankol, Indysh, Alykbashka, which are genetically related to rather young acidic intrusions (diorite, keratophyres, porphyrites). The barite of Dzhalankol contains (spectrographically detd.) Sr 0.4%, Mn 0.07, Ca 0.3, Cu 0.0001, Mg 0.002%; traces of Al, Pb, Zn. Microscopic inclusions of chalcopyrite, cuprite, sphalerite, and kaolinite were observed. From liquid inclusions (neg. crystals), a temp. of crystn. of 130 to 160° was calcd. Very interesting etch figures are described. The intimate paragenesis of $BaSO_4$ with quartz is characteristic for the Alykbashka veins (barite rock) and the chem. analysis shows 14-26% quartz; 0.25% MgO; 0.3-0.8% CaO; 0.5-1.6% R_2O_3. W. Eitel



APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000413610004-2"

FRANK-KAMENETSKIY, V. A.

USSR/Geophysics - Geology Seminar Jul 52

"Works of the Philosophical Seminar Held by the Professor-Instructor Staff and Aspirants of the Geological Faculty /of Leningrad University_/," T. A. Kazakevich, G. M. Saranchina, and V. A. Frank-Kamenetskiy

"Vest Leningrad U, Ser Biol, Geog, Geol" No 7, pp 145 - 149

PA 243T78

FEDOROV, Evgraf Stepanovich, 1853-1919; ANSHELES, O.M., professor, redaktor; SHAFRANOVSKIY, I.I., professor, redaktor; FRANK-KAMENETSKIY, V.A., starshiy nauchnyy sotrudnik, redaktor.

[Principles of the theory of figures] Nachala ucheniia o figurakh. Red.i primechaniia O.M.Anshelesa, I.I.Shafranovskogo i V.A.Frank-Kamenetskogo. [Leningrad] Izd-vo Akademii nauk SSSR, 1953. 409 p. (MLRA 6:12)
(Geometry)

1. FRANK-KAMENETSKIY, V.A., MAIMYEVA, T.P.

2. USSR (600)

4. Hydrocarbons - Transcarpathia

7. Curtisite from Transcarpathia. Dokl.AN SSSR No. 1 1953.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

FRANK-KAMENETSKIY, V. A. Apr 53

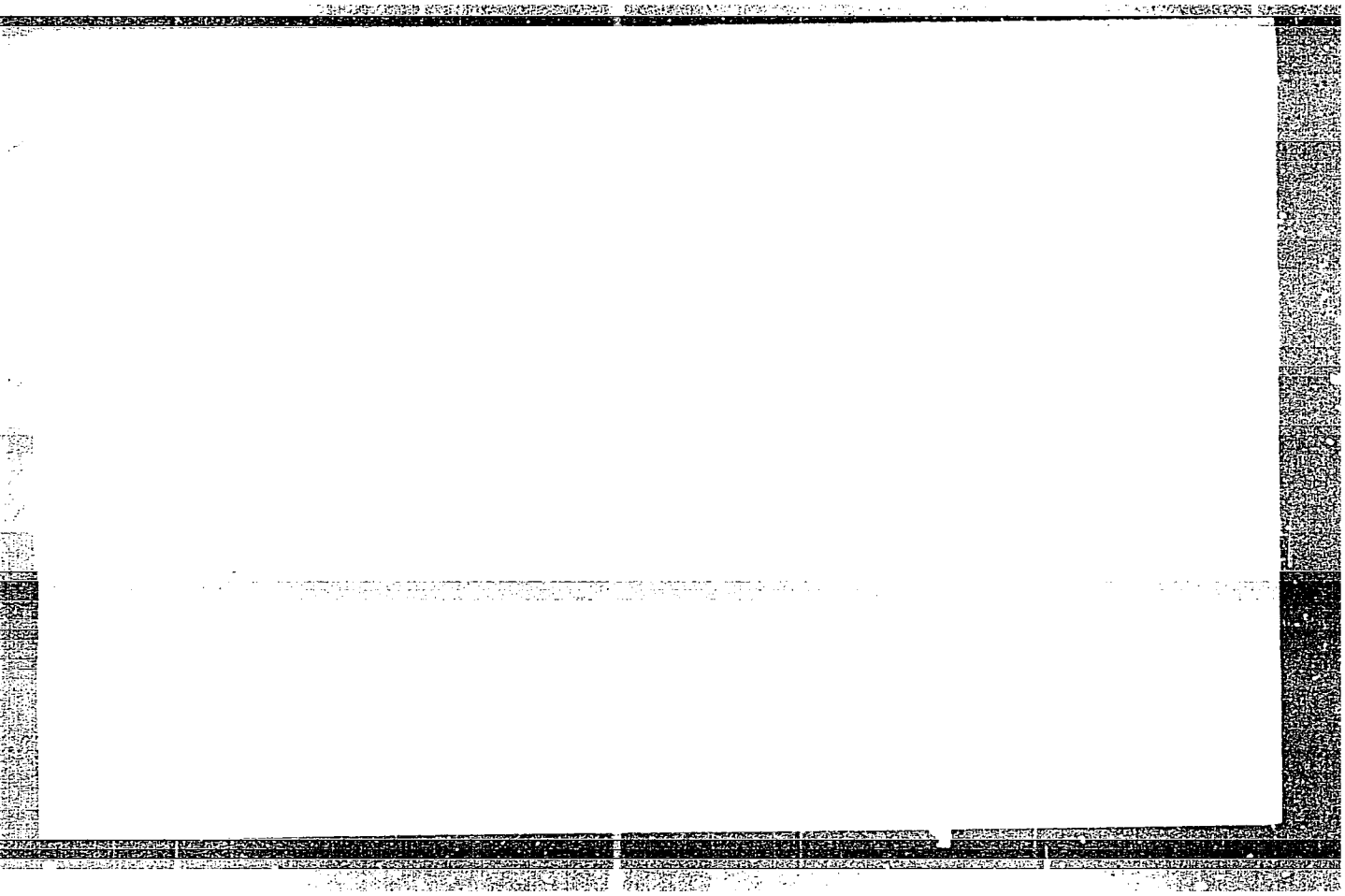
USSR/Physics - Crystallography

"Review of 'New Investigations in Crystallography and Crystallochemistry,'" (V. A. Frank-Kamenetskiy, reviewer).

Usp Fiz Nauk, Vol 49, No 4, pp 628-630

Reviewed book presents abridged translations of foreign articles processed by G. D. Vigdorovich, A. S. Anishkina, B. V. Nenart, T. L. Khotsyanova, V. M. Koshin, N. D. Katsenelenbaum, Yu. G. Zagalskiy, and N. A. Pobedimskaya, with preface by Prof G. B. Bokiya, the editor.

267T92



APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000413610004-2"

FRANK-KAMENETSKIY, V. A.

Chemical Abst.
Vol. 48 No. 9
May 10, 1954
Mineralogical and
Geological Chemistry

X-ray data on florencite and kolvinite. V. A. Frank-Kamenetskii, A. I. Komkov, and V. V. Nurdov (A. A. Zhdanov State Univ., Leningrad). *Zapiski Vsesoyuz. Mineralog. Obschchestva* (Mém. soc. russe minéral.) 82, 297-301(1953); cf. A. A. Kukharenko: *Ibid.* 80, 238 (1951); A. N. Labuntsov, *Trudy Mineralog. Muzeya, Akad. Nauk S.S.S.R.* 1950, No. 2, 135-6.—The identity of florencite with "kolvinite" is shown by extensive optical, goniometric, and x-ray measurements. The florencite described by Prior and Hussak (*Mineralog. Mag.* 12, 244 (1900)) is somewhat different, with lower ns, and d., and the same is true for stiepelmannite (cf. Ramdohr and Thilo, *C.A.* 34, 2292⁸). The minerals form an isomorphous series of rhombohedral symmetry. The unit cells of fluorencite and kolvinite: $a_0 = 6.960 \pm 0.005$ A.; $c_0 = 16.34 \pm 0.04$ A.; $c_0/a_0 = 2.35$; d. 3.67-3.70. For stiepelmannite: $a_0 = 6.75$ A.; $c_0 = 16.52$ A.; $c_0/a_0 = 2.46$; d. 3.605.
W. Eitel

9-2-54 gjp

USSR

Curtisite from Trans-Carpathia. V. A. Frank-Kamenetskii and T. P. Maleeva (A. A. Zhdanov State Univ., Leningrad). *Doklady Akad. Nauk S.S.S.R.* 88, 135-6(1953).—Well developed tabular crystals of curtisite, $C_{16}H_{16}$, are described from Trans-Carpathia, on a contact between dinite-porphyrite and argillites, on cracks; the mineral is younger than calcite. Cleavage (001) perfect, distinct on (100); hardness 1 to 1.5; yellow to greenish, translucent or transparent in thin tables; orientation $c = \gamma$; $a = \alpha$; $b = \beta$; dispersion $r > v$. Probably orthorhombic; $\alpha = 1.[illegible]$; $\beta = 1.734$; $\gamma = 2.10$. Combustible, easily dissolved in org liquids. Five intense x-ray interference lines are given for the powder diagram as characteristic. W. Eitel

GADOLIN, A.V.; ANSHELES, O.M., redaktor; SHAFRANOVSKIY, I.I., redaktor; FRANK-KAMENETSKIY, V.A., redaktor; SAZONOV, L.S., redaktor; PETROVSKIY, I.G., akademik, redaktor; ANDREYEV, N.N., akademik, redaktor; BYKOV, K.M., akademik, redaktor; KAZANSKIY, B.A., akademik, redaktor; OPARIN, A.I., akademik, redaktor; SHMIDT, O.Yu., akademik redaktor; SHCHERBAKOV, D.I., akademik, redaktor; YUDIN, P.F., akademik, redaktor; KOSHTOYANTS, Kh.S., redaktor; MAKSIMOV, A.A., redaktor; SAMARIN, A.M., redaktor; LEBEDEV, D.M., doktor geograficheskikh nauk, redaktor; FIGUROVSKIY, N.A., doktor khimicheskikh nauk, redaktor; KUZNETSOV, I.V., kandidat filosofskikh nauk, redaktor; OZNOBISHIN, D.V., kandidat istoricheskikh nauk, redaktor; SMIRNOVA, A.V., tekhnicheskiy redaktor

[Development of all crystallographic systems and their subdivisions from a common origin] Vyvod vsekh kristallograficheskikh sistem i ikh podrazdelenii iz odnogo obshchego nachala. Redaktsiia i primechaniia O.M.Ansheleса, I.I.Shafranovskogo, V.A.Frank-Komenetskogo. [Leningrad] Izd-vo Akademii nauk SSSR, 1954. 155 p. (MLRA 7:10)

1. Chlen-korrespondent AN SSSR (for Koshtoyants, Maksimov, Samarin) (Crystallography)